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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,131	12/15/2003	Kye Nam Lee	40296-0052	9157

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EXAMINER

KENNEDY, JENNIFER M

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

212

Office Action Summary	Application No. 10/734,131	Applicant(s) LEE, KYE NAM	
	Examiner Jennifer M. Kennedy	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/2/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

In view of Applicant's amendment to claim 1, the objection is withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amano et al. (U.S. Patent Appl. 2002/0044396).

Amano et al. discloses a method for manufacturing MTJ cell of MRAM comprising: forming a metal layer (201) for connection layer connected semiconductor substrate through lower insulating layer (see [0106]); forming a pinned magnetic layer (204a) on the metal layer; forming an amorphous on the pinned magnetic layer (see [0111]); sequentially forming a tunneling barrier layer (206), a free magnetic layer (207) and MTJ capping layer (209) the amorphous layer; and patterning MTJ capping layer, free magnetic layer, the tunneling barrier layer, amorphous layer and the pinned magnetic layer using a MTJ cell mask form a MTJ cell (see [0070]).

Amano et al. do not disclose the method of forming the amorphous layer by physically impacting a surface of the pinned magnetic layer with an atom. The examiner takes official notice of facts outside the record which are capable of instant and unquestionable demonstration as being "well-known" in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the amorphous layer by physically impacting the surface of the pinned magnetic layer with an atom because Amano et al. teaches the addition of the P atom creates an amorphous layer and it is well known in the art to add atoms by implantation because implantation allows for control of concentration and depth of atoms. Further, it is noted that ion implantation creates ion implantation damage in a crystal structure in the implanted layer resulting in an amorphous layer.

Amano et al. also discloses the method wherein the atom is selected from the group consisting of P or As (see [0111]).

Response to Arguments

Applicant's arguments filed December 20, 2004 have been fully considered but they are not persuasive. Applicant argues that the tunnel barrier layer 206 of Amano et al. is not formed on the insulating layer 205 as claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the tunnel barrier layer to be formed directly on and in physical contact with the insulating layer) are not recited in the

rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The examiner notes that the word on does preclude intervening layers. For example the MRAM stack is formed on the substrate even though there is an intervening layer of insulation and a metal connection.

Applicant also argue that Amano et al. forms two magnetic fixed layer and the presently claimed invention only recites on step of forming a single pinned magnetic layer. The transitional phrases "comprising", "consisting essentially of" and "consisting of" define the scope of a claim with respect to what unrecited additional components or steps, if any, are excluded from the scope of the claim. The transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., > *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327 F.3d 1364, 1368, 66 USPQ2d 1631, 1634 (Fed. Cir. 2003) ("The transition comprising' in a method claim indicates that the claim is open-ended and allows for additional steps.");< *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.); *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986); *In re Baxter*, 656 F.2d 679, 686, 210 USPQ 795, 803 (CCPA 1981); *Ex parte Davis*, 80 USPQ

448, 450 (Bd. App. 1948) ("comprising" leaves "the claim open for the inclusion of unspecified ingredients even in major amounts") (see MPEP 2111.03 [R-2] Transitional Phrases). Therefore the claim as currently written does not exclude additional layers.

Applicant's arguments with respect to the method of physically impacting a surface of the pinned magnetic layer with an atom to form an amorphous layer have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sharma et al. (U.S. Patent No. 2004/0085687) discloses additions of amorphizing agents to the FM layer create an amorphous layer FM material and allows for smoothness (see [0031]). Futamoto et al. (U.S. Patent No. 6,183,893) disclose the method of implanting or diffusing ions into magnetic material in order to incorporate the ion within the layer (see column 5, lines 25-45). Ohtsuka et al. (U.S. Patent No. 6,055,139) disclose that implanting the magnetic layer improves the amorphous state (see third example). Kawawake et al. (U.S. Patent No. 2002/0036876) disclose implanting the magnetic stack to form an amorphous layer (see [0053]). Araki et al. (U.S. Patent No. 5,874,886) disclose that the concentration of amorphous agents is critical (see column 10)

Art Unit: 2812

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jennifer M. Kennedy
Patent Examiner
Art Unit 2812

jmk